

should be put on the market at a reasonable price." The friability of such cokes has proved a grave obstacle, and, if one seeks to avoid it by briquetting, Mrs. Fishenden's results suggest that any superiority in radiating power would be more than wiped out, while the high cost of pitch—the natural binding material—is not helpful. The Fuel Research Board and private workers are busy with the problem.

One cannot help thinking that the real domestic smoke problem is presented, not by the grates of the type studied by Mrs. Fishenden, but by the enormously more numerous and more voracious kitchen ranges used for cooking as well as for heating. Would a smokeless fuel prove serviceable for these? The present report does not deal with the kitchen range.

Mrs. Fishenden has exploded several popular fallacies. Powders have been sold (under promising names) which are alleged to effect marvellous economies in fuel, as vouched for by people whose official descriptions ought to have implied better things. Some of these powders were examined and found to be essentially common salt coloured with iron oxide. No appreciable effect on the radiant efficiency of a fire consuming coal treated with these salts could be detected. To-day, when coal and money are so scarce, a protective publicity might well be given to these tests in the daily Press.

It appears generally from Mrs. Fishenden's work that the wastefulness of the open fire may be lessened by the use of carbonised fuel, and particularly by the cutting down of draught so as to limit the air drawn through the room and into the chimney to the quantity required for ventilation. The use of solid fuel is still cheaper than that of gaseous fuel for fires which have to be in constant use.

Not the least useful part of the report is the appendix, containing a summary of recent bibliography of work on domestic heating appliances. Attention may well be directed to earlier students of the problem—Rumford, Peclet (whose "*Traité de Chaleur*" still repays perusal), and more recently Dr. Pridgin Teale, of Leeds, who may be regarded as the pioneer of modern grate reform in this country. Peclet, and perhaps Rumford, seemed quite clear about the significance of excessive flue draught and the need for restricted and variable flue openings, and in reading his treatise one can only marvel that the manufacture of crude appliances has continued to the present day. Still, Mrs. Fishenden's work has placed the whole subject on a more substantial foundation of carefully ascertained data, an achievement which should prove valuable in the campaign of smoke abatement and fuel economy, and at a cost which seems to be relatively insignificant. J. W. C.

A Handbook to Roman Pottery.¹

THE term "terra sigillata," denoting certain well-known classes of Roman pottery, may be unfamiliar to the ordinary reader, but it is gradually coming into use in place of the somewhat misleading "Samian ware" of the nineteenth-century antiquarian. The late Prof. Haverfield, indeed, stoutly upheld the use of the older term; but it is open to decided objections, being purely conventional, unhistorical, and non-descriptive. Such expressions as "Roman red-glazed ware," "Gaulish red ware," etc., may be more accurate, but are not sufficiently definitive. The authors of the work under review have, therefore, followed Continental precedent and adopted this term, which strictly denotes "clay decorated with stamped patterns" (from *sigillum*, a stamp). The ware with which they deal is the pottery produced under the Roman Empire and found in all parts of Western Europe, which is marked by the use of a fine red paste and a lustrous red glaze, and usually ornamented by means of patterns and figures in relief.

It is the first attempt made in this country to produce a handbook to the study of this pottery, which during the last twenty years has made a great advance, owing to the labours of British, French, and German archaeologists, and to the more careful attention paid to the results of scientific excavations in this country. We most heartily

congratulate the authors on their work, which is distinguished both by exhaustive knowledge and by scientific accuracy.

Their aim has been to arrive at definite conclusions concerning the development of Roman pottery under the Empire by a diligent study of such details of technique, form, decoration, and design as can be of assistance for purposes of dating, and to base on the results of detailed study

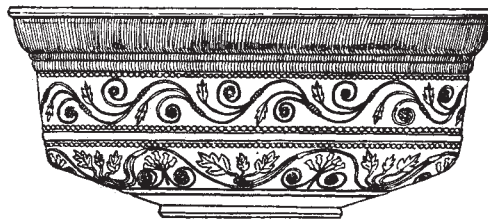


FIG. 1.—Vase of La Graefesenque ware (Form 29) with scroll decoration (about A.D. 40).

a general consideration of the evolution of this pottery and the sources of its inspiration.

The book is divided into ten chapters, the first two being of a general and introductory nature. Chap. iii. deals with "dated sites"—i.e. those where the approximate dates of occupation are known, such as Haltern in Germany (11 B.C. to A.D. 9). Chap. iv. gives a list of the potters whose names are stamped on the vessels, arranged in chronological groups. In chap. v. the vessels decorated in moulded relief are discussed under

¹ "An Introduction to the Study of Terra Sigillata: Treated from a Chronological Standpoint." By Felix Oswald and T. Davies Pryce. Pp. xii+286+12xxv plates. (London: Longmans, Green, and Co., 1920.) Price 42s. net.

the principal forms of bowls employed. The evolution of the forms and decoration is worked out in a most lucid and interesting manner. The chronological value of this development is further described in chap. vii., and in chap. vi. we have an interesting discussion of the origin of the decorative designs. The figure-subjects are mostly to be traced to the art of the Augustan period, and the decorative motives in many cases to earlier phases of Greek art. It seems a little doubtful,

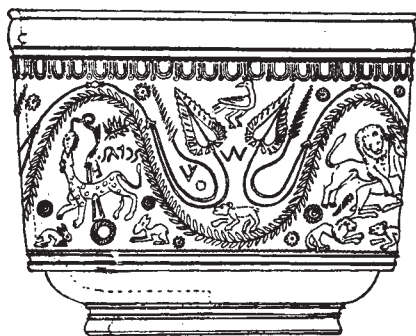


FIG. 2.—Vase of La Graufesenque ware (Form 30) combining scrolls with figure subjects (about A.D. 60).

however, whether motives and methods of decoration which were employed in early Greek art, and disappeared in the sixth century B.C., or even earlier, can have actually influenced the Roman potter. An instance is the "nautilus" ornament found on the Arretine vases and some early Gaulish wares of the first century after Christ. The nautilus certainly occurs in Minoan pottery, but its use was localised, and it is not known in Greek art. It is possible that this pattern is really intended to represent a fern-frond.

Chap. viii. is devoted to a discussion of the plain wares which have only potters' stamps without decoration, and chap. ix. to other methods of decorating *sigillata* ware by painting, incising, or *en barbotine* (patterns produced in relief by thick layers of liquid clay). The final chapter deals with the origin and evolution of *terra sigillata*, and is a general summing up of the whole subject.

There are no fewer than eighty-five excellent plates, all drawn by hand, with adequate biblio-



FIG. 3.—Vase of Lezoux ware (Form 37) with panel decoration (about A.D. 100).

graphical references, and a useful map of sites forming the frontispiece. The general and detailed bibliographies on pp. 245 ff. will also be invaluable to the student of the subject. We should have been glad to discuss this admirable work in much fuller detail, but space forbids, and we can only recommend those who have any interest in the subject to lose no time in becoming acquainted with its contents.

Our illustrations reproduce three typical forms of Gaulish vases with decoration.

Industrial Research Associations.

VII.—THE RESEARCH ASSOCIATION OF BRITISH MOTOR AND ALLIED MANUFACTURERS.

By H. S. ROWELL.

NO branch of engineering is so much the creature of taste and fashion as the automobile industry. No industry of anything like the same dimensions is so much dependent on the views, almost the caprices, of the layman. Almost certainly no industry in this country has had such a meteoric or rather rocket-like post-war career as that responsible for the manufacture of motor vehicles. These facts must be borne in mind in considering the development of the Research Association of British Motor and Allied Manufacturers.

After the armistice the release of petrol supplies, the diversion of manufacturing agencies from war work, and the natural desire of an overworked public for convenient locomotion and healthy relaxation gave the motor-car trade an unprecedented boom. Motor-car manufacturers were not only confronted with all the distracting problems of reconstruction, but, in addition, they had pros-

pects of—several firms, indeed, had orders for—some years of work. While one or two other research associations were formed as a vital necessity to preserve the existence of the corresponding industries against foreign competition, the motor trade had at the time of the incorporation of this association in May, 1919, no such incentive. At that time to many in the motor industry it must have seemed a luxury, if not an extravagance. Those who have had to do with the inauguration of new societies, especially of societies novel in form or object, know how much work and time are involved in seeking, and often in reconciling or converting, the views of busy men. Even then much preliminary work is necessary before staff can be appointed for the necessary executive work. The Research Association of British Motor and Allied Manufacturers was formed under the ægis of the Association of British Motor Manufacturers, and it is largely to the energy and enthusiasm of